

Census
REF
HF
54.52
.U6
U86x
1994

For Reference

Not to be taken from this room

U.S. Merchandise Trade
Statistics

A Quality Profile

Census
REF
HF
54.52
.46
486 x
1994

U.S. Merchandise Trade Statistics

A Quality Profile



BUREAU OF THE CENSUS
LIBRARY

Methods Research & Quality
Assurance Branch
Foreign Trade Division
Bureau of the Census
April 19, 1994

Table of Contents

I.	Introduction:	
	Purpose of the Paper	1
	Background	1
	Source of the Statistics	1
II.	Quality Issues:	
	Background	2
	Sources of error:	
	Missing Documents	2
	Timeliness	4
	Reporting Errors	4
	Data Capture Errors	6
	Quality and Automated Reporting	7
III.	Adjustments:	
	Adjustments for Seasonal and Trading Day Variation	8
	Adjustment for Price Change	8
IV.	Conclusion	9
V.	Appendices:	
	Annotated Bibliography	10
	Glossary of Acronyms	11
VI.	Tables:	
	Undocumented Exports to Canada	12
	Total Import and Export Carry-over	13

I. INTRODUCTION

Purpose of the Paper

The merchandise trade statistics measure goods traded between the United States and other countries. They are the official source of information about U.S. imports, exports and balance of merchandise trade. As a leading economic indicator and a major component of the Gross Domestic Product (GDP), the statistics provide critical information to a wide and varied group of users in the public and private sectors. The Census Bureau strives, with available resources, to provide accurate, high quality statistics to meet these needs. However, to use the information wisely and appropriately, users need to understand the nature and limitations of the merchandise trade statistics program. This paper discusses issues affecting the quality of the statistics and some known limitations.

Background

In 1989 the Census Bureau invited the National Academy of Sciences (NAS) to study the merchandise trade statistics program. In its resulting report, Behind the Numbers, released in January 1992, NAS noted that limitations in the statistics are not well communicated to the users. This profile addresses this concern by presenting known limitations in the trade statistics and by evaluating known sources of error. It also includes discussions of recent and proposed improvements in the quality of the statistics.

The Census Bureau intends to issue annual reports providing information on any changes in the program that affect the quality of the statistics. Comments or questions about the information in this paper or suggestions for future reports are welcome. Address them to Kathy Puzzilla, Chief of Methods Research and Quality Assurance Branch, Foreign Trade Division (301) 763-7760 or Bruce Walter, Assistant Chief, Foreign Trade Division (301) 763-7020.

Source of the Statistics

The Census Bureau compiles import and export statistics from information collected by the Customs Service at ports of entry and exit. In 1992, the Census Bureau collected trade statistics on more than 16,000,000 import transactions and more than 13,000,000 export transactions. This information represented shipments through more than 400 ports of entry and exit in the United States, Puerto Rico and the Virgin Islands. Information of ninety-five percent of the import transactions and fifty-five percent of the export transactions was submitted electronically. The remainder was captured from paper documents.

II. QUALITY ISSUES

Background

Users of the statistics often assume that, since the Customs Service collects the information on import and export transactions, the published statistics represent an exact accounting of merchandise trade. In practice the collection of import and export statistical information is only one of many responsibilities of the Customs Service. However, since import information also provides the basis for the administration of tariffs, quotas and other enforcement activities, import statistics generally represent a better measure of trade than export statistics.

The Customs Service limits export enforcement activities to shipments exported under export licenses. Licensed shipments represent less than five percent of total export shipments. For the most shipments, Customs merely collects and forwards Shipper's Export Declarations (SEDs), the export statistical document, to the Census Bureau for processing. Few Customs ports screen for missing SEDs or check the completeness or accuracy of information reported on SEDs.

Sources of Error

The major sources of error in the merchandise trade statistics include missing documentation, timeliness, and incomplete or inaccurate reporting.

A. Missing Documents

Federal regulations require importers, exporters or their agents to submit import and export information for all merchandise shipments above established exemption levels. Exemption levels are \$1250 (\$250 for quota items) for imports and \$2500 for exports. Through comparisons of trade data with major trading partners, the U.S./Canada Data Exchange and audits of trade documentation, the Census Bureau has identified missing information for both import and export shipments. Missing documentation, for the reasons previously noted, is more common with exports. The Census Bureau takes remedial action and corrects the published statistics whenever possible.

1. Reconciliations (Trade Data Comparisons)

In the early 1970s, The United States and Canada began annual studies to reconcile differences in merchandise trade statistics compiled by the two countries. After adjusting for differences in trade definitions, valuation, timing and errors, the studies uncovered a chronic understatement of each countries's exports. The 1970 reconciliation estimated undocumented U.S. exports to Canada at \$500 million (about six percent of total estimated exports to Canada). By 1986 undocumented U.S. exports to Canada grew to an estimated \$10.2 billion (more than eighteen percent of total estimated exports to Canada). (See Table A.)

In the spring of 1987 the statistical and Customs agencies from both countries met to find a way to deal with undocumented export shipments. The agencies agreed that the open border between the two countries and the lack of enforcement of filing requirements for truck and rail shipments created the problem. They knew that to

introduce adequate enforcement practices would require a larger Customs work force and impede the flow of traffic at the border.

Anticipating the adoption of the international Harmonized System of Commodity Classification (HS) by both countries, the agencies recommended the exchange of import information instead of collecting export documents. In July of 1987, they signed a Memorandum of Understanding that allowed the exchange of detailed import records. In January 1990, after two years of analysis and major program changes, the Census Bureau substituted Canadian imports for U.S. exports. Simultaneously Canada replaced its exports with U.S. import statistics. Both countries dropped requirements for filing export documents.

Several immediate improvements to the U.S. export statistics resulted from the introduction of the data exchange. Most important, it almost eliminated undocumented shipments to Canada. Also, since the Canadian data are pre-edited, it improved the accuracy of the data reported to Census and ensured its inclusion in the correct statistical month.

The success of the U.S./Canadian reconciliations prompted the Census Bureau to seek reconciliation agreements with other major trading partners. It now conducts reconciliation studies with Japan, Korea, Mexico, Australia and the European Economic Community (EC). Although the Bureau of Census does not expect other data exchanges to result from these reconciliations, the studies provide valuable information about the quality of the U.S. merchandise trade statistics. Reconciliation studies completed with Japan, Korea, and the EC estimate undocumented U.S. exports at between three and seven percent (depending on the trading partner).

Specific errors in the U.S. trade data also surfaced during these studies. For example, discrepancies between U.S. and Japanese statistics led to the discovery that the U.S. import statistics omitted \$2.4 billion in Japanese passenger cars and trucks shipped between April 1990 and November 1992 (an adjustment appears in the December 1992 FT 900 press release issued in March 1993).

2. Port Audits

Concern about the level of undocumented exports also led the Bureau of Census and the Customs Service to plan a series of audits at major Customs ports. They proposed audits at four airports, four vessel ports and two overland ports on the Mexican border. Besides checking for undocumented export shipments, the audits assessed the enforcement of export filing requirements. Because of the different filing requirements for each mode of transport (MOT), each MOT required different audit procedures. The two agencies decided to start with airports, followed by the vessel ports and ending with the Mexican border.

Between September 1988 and April 1989, the agencies audited air cargo manifests and corresponding SEDs filed at Seattle/Tacoma Airport (SEATAC), Miami International Airport (Miami), John F. Kennedy International Airport (JFK) and Los Angeles International Airport (LAX). The audits produced estimates of undocumented export shipments that closely paralleled the findings of the reconciliations described earlier.

The port audits estimated undocumented exports at between two and eight percent.

The Miami audit also uncovered the presence of deliberate misclassification and undervaluation of shipments to Central and South America. These practices involved a small percent of export shipments to these countries. The motive for this deliberate misreporting is the circumvention of high tariffs or quotas in the countries of destination. The audits uncovered no evidence of this practice at the other three airports.

The port audits proved very expensive to conduct. After the completion of the airport audits, the agencies abandoned the audits in favor of expanding bilateral reconciliations. These studies require fewer resources.

B. Timeliness

Timing problems result when import or export shipments are not included in the correct transaction month. During the early 1980s scarce resources caused the U.S. Customs Service to relax its procedures for handling statistical documents. These changes, coupled with dramatic increases in the numbers of import and export transactions, delayed the delivery of large numbers of documents to the Census Bureau processing center. Often these late arrivals were too late for inclusion in the proper month's statistics. Because these shipments carried over into a subsequent month's statistics, the Census Bureau coined the term "carry-over."

During the period 1984 to 1988, the Census Bureau and the Customs Service introduced changes to collection and processing procedures to reduce the effect of "carry-over" on the statistics. Ultimately the Census Bureau delayed the merchandise trade release (from thirty to forty-five days after the end of the calendar month) to allow more time for receipt and processing of documents. In addition, it revised prior month trade totals to credit the value of any remaining late documents to the proper statistical month. Increased use of automated reporting by the Customs Service and the Census Bureau also has improved the timeliness of the data and decreased "carry-over." In 1992 "carry-over" was less than one percent of total import and export values during initial publication of the data and less than 0.1 percent after revision of prior month totals. (See Table B.)

C. Reporting Errors

Reporting errors are mistakes or omissions made by importers, exporters or their agents when reporting import or export shipments. Most errors involve missing or invalid commodity classification codes and missing or incorrect quantities or shipping weights. They have a negligible effect on import, export and balance of trade statistics. However, they can affect detailed commodity and transportation statistics significantly if not corrected or corrected inaccurately.

Recent studies show that twenty-five percent of export transactions and eight percent of import transactions contain one or more reporting errors. Most of these errors are easily and accurately resolved with no significant effect on the published statistics.

Routine processing procedures include methods for correcting these errors through clerical or electronic means. However, clerical correction is time consuming and expensive. Defective records referred for clerical correction can cost three times as much to process as documents that successfully pass the edits. Also records referred for correction may not get into the correct statistical month. Electronic corrections or imputes, which are less expensive, may introduce some error into the statistics. Therefore, the most accurate and cost-effective means of resolving reporting errors is to prevent them from occurring.

Beginning in 1991 the Census Bureau introduced programs to reduce reporting errors by educating Customs Service staff, exporters and forwarding agents about the statistical reporting requirements.

--- Customs Port Briefings

Port briefings consist of a review of Customs statistical collection activities followed by briefings for Customs Service staff. These briefings help increase Customs staff awareness of their role in the collection of merchandise trade statistics. The review, conducted before the briefing, provides background information for the briefings and frequently leads to suggested improvements in Customs processes.

--- Exporter Education Program

The goal of the Exporter Education Program (EEP) is to improve the quality of statistics by reducing the SEDs submitted with missing, obsolete, or invalid information. The EEP identifies exporters responsible for reporting errors, educates them in proper reporting, tracks their improvement, and follows-up as appropriate.

During the initial two phases of EEP, in 1991 and 1992, we concentrated on contacting exporters responsible for specific types of reporting errors. We mailed more than 80,000 educational packets consisting of letters, other educational materials, and samples of defective documents filed by the pertinent exporter. Follow-up analysis shows the program reduced reporting errors on SEDs about twenty percent.

The current phase of EEP, which began with January 1993 statistics, takes a different approach. Instead of targeting exporters making certain types of errors, this phase targets 150 exporters who account for fifteen to twenty percent of reporting errors and profiles their performance. Census Bureau analysts contact the exporter by telephone and discuss the reporting errors with the parties responsible for document preparation. The telephone conversation is confirmed with a letter.

This process focuses on reducing reporting errors and by encouraging a personal and interactive relationship between analysts and document preparation personnel at the exporting company.

--- Shipper's Export Declaration Seminars

From 1991 through 1993, the Census Bureau conducted more than thirty free educational seminars. These seminars focus specifically on how to prepare SEDs. More than four thousand participants from exporting companies, forwarding agencies,

carriers, and consulting firms attended. The seminars consisted of a video presentation and question and answer sessions.

During 1993 the Census Bureau concentrated SED seminars along the Mexican border. To meet the special needs of exporters and forwarders in the area, it produced videos in Spanish and English on how to prepare SEDs for the seminars. These videos may be purchased for a small fee or borrowed from local Customs Service offices. The Census Bureau will continue programs to educate the trade community.

D. Data Capture Errors

As explained earlier, the Census Bureau captures import and export information from administrative documents and through various automated collection programs. It subjects data from each source to security checks to ensure the accurate capture of the information.

--- Automated Submissions

Data received through automated collection programs; the Automated Broker Interface (ABI), Automated Export Reporting Program (AERP) and the U.S./Canada Data Exchange are screened upon receipt to ensure completeness and an acceptable level of accuracy. Other security procedures guard against file damage that may compromise the integrity of the data.

--- Paper Documents

The Census Bureau uses a combination of data entry edits and keying verification to ensure the accurate capture of information from the SEDs and Customs Entry Forms. Automated data entry checks validate all critical data fields and signal the keyer when the information is invalid. This process prevents most keying errors and intercepts many reporting errors.

After data entry, the keyed information is subjected to sample verification. Certain information common to all transactions and all information for transactions valued over \$2,000,000 for imports and \$5,000,000 for exports is 100 percent verified. Lower valued transactions are verified from a two percent sample of documents. This provides the information needed to assess the magnitude of error introduced through keying and the means to intercept and correct poorly keyed batches. It also monitors the keying performance of individual data entry clerks.

The verification plan assures an outgoing keying error rate of less than 2.10 percent for imports and 1.27 for exports. For 1990 through 1992, verification reports showed actual outgoing error rates of about 1.25 percent for imports and 0.60 percent for exports. Error rates are calculated as a percentage of records or transactions.

Quality and Automated Reporting

The increased use of automated reporting has generally improved the quality of the merchandise trade statistics. The Census Bureau now receives more than ninety-five percent of import transactions and more than fifty-five percent of export transactions electronically. As explained earlier, automated reporting allows the Census Bureau to receive and compile the data quickly and include almost all shipments in the correct statistical month. Automated reporting minimizes lost data and provides better control over non-filing. Finally, since Census receives pre-edited data through the U.S./Canada Data Exchange and ABI as well as partially edited information through the AERP, the information arrives at the Census with fewer reporting errors. Recent studies show that about fifty percent or one in two export records captured from SEDs (export paper documents) contains an error as compared to about eight percent or one in eleven AERP or Canadian data exchange records. Likewise, about one in four data records captured from Customs Entry Forms 7501 (import paper documents) contains an error as compared to one in twelve ABI records.

The enhanced quality of automated submissions results from the high standards required of automated reporters. The Customs Service and the Census Bureau test and approve all ABI brokers and AERP participants before they can submit shipments electronically. Many statistical Census edits reside in the Customs computer system and intercept data problems for return to the ABI broker for resolution. ABI participants who fail to resolve problems or who repeatedly make the same errors face possible fines or penalties. AERP participants also must maintain acceptable levels of performance or face removal from the program.

Similarly many Census edits reside in the Statistics Canada import processing system to meet U.S. export needs. Also the statistical and customs agencies of each country have designated staff that meet regularly to resolve any problems and keep abreast of any changes that may affect the export programs.

To reduce further export filing on SEDs, the Customs Service is working on the development of an Automated Export System (AES) similar to the ABI system. AES will link to other Customs automated tracking systems to help prevent undocumented shipments. It also will incorporate Census statistical edits to improve the quality of reported data.

The Customs Service conducted a sixty day test of AES using export transactions March and April 1993 at the port of Charleston, South Carolina. Participating carriers transmitted manifest data directly to Customs. Corresponding statistical merchandise trade data were keyed from SEDs and transmitted to Customs by the Charleston port authority.

Initially the AES edits intercepted statistical reporting errors on over forty percent of the SEDs transmitted to Customs. The reasons for rejection involved missing or incorrect quantities or units of measure (68 percent) and invalid HS classification codes (32 percent). This high percentage of reporting errors fell to three percent after participants adopted special screening and editing processes used by the Census Bureau to identify and capture statistical data from incorrectly prepared SEDs.

The AES test proved that the electronic interface between the trade and Customs can receive and transmit data and that the edits and validations planned for AES will significantly improve the quality of export statistics. Despite these accomplishments, the Customs evaluation team found

significant flaws in the conduct of the test and recommended more testing before national implementation.

The Census Bureau continues to support strongly AES. However, until AES is operational the Census Bureau will continue to expand the AERP program.

III. Adjustments

The Census Bureau adjusts merchandise trade data to remove the effects of seasonal influences and price shifts. Adjusted data appear in the monthly FT900 "U.S. Merchandise Trade" ("U.S. International Trade in Goods and Services" in 1994) released by the Department of Commerce. The adjustments remove known or predictable influences that may obscure true changes in the volume of merchandise traded.

Adjustment for Seasonal and Trading Day Variation

These adjustments, computed using the Census Bureau's X-12-Arima program (a variation of X-11 with Arima modeling), remove predictable calendar effects from the data. X-12 develops seasonal factors from historical series of data. The merchandise trade series exhibit a high level of irregular variation. To help overcome this problem, the Census Bureau uses the mathematical modeling of X-12 to adjust for level shifts and outliers in the data series. The choice of model can affect the calculation of factors and will change over time as more data are added to the series. Generally the use of longer series will help clarify the seasonal patterns.

However, the adjustments will not remove all seasonal variation. If the timing and magnitude of the seasonal effect is not predictable or stable the Census Bureau cannot adjust the series. As working day effects (the differences between the level of trade on specific days of the week) are generally small, the high irregular variation of many series prevents accurate identification of these movements. Thus, while the final published series show no clear evidence of working day effect, some residual influence may be present.

Adjustment for Price Change

Besides seasonally adjusting the data, the Census Bureau also publishes trade data on a constant dollar basis. The adjusted data provide an estimate of the change in the volume of trade, as distinct from value changes resulting from price shifts. The Census Bureau bases the adjustments on the International Price Indexes (IPI) published by the Bureau of Labor Statistics (BLS), supplemented with deflators produced by the Bureau of Economic Analysis (BEA).

Only a few indexes are available for the first two months of each quarter. BLS makes a complete set of end use indexes available for the final month of each quarter. Using a procedure developed by BEA, the Census Bureau extrapolates the detailed indexes based upon the higher level monthly indexes. As a result, changes from the second to the third month of each quarter may be larger than for other months. Studies show that these procedures do not distort the indexes. However, month-to-month changes in the detailed data should be used with caution.

The Census Bureau deflates trade in computers and peripherals using the quality adjusted hedonic deflator computed by BEA. BEA uses the attributes (speed, memory capacity, etc.) of the computer equipment to estimate the value of quality improvements over time. Prices relative to quality have dropped rapidly for this product grouping. As a result, computers and peripheral equipment comprise a larger part of total value on a constant dollar basis than on a current dollar basis. Users may wish to examine this area of trade separately from total trade.

IV. Conclusion

The merchandise trade statistics program was originally designed to meet the basic needs of policy makers and provides reasonable estimates of total trade with other countries. However, the program has grown in scope and complexity, attempting to meet the needs of many different data user groups. For example, the program collects transportation data for air and vessel carriers, port authorities and the Department of Transportation. It also collects detailed commodity information for trade associations, marketing analysts and government agencies investigating the impact of international trade on local industry and economies.

The needs of data users expand and change continuously. The Census Bureau and the Customs Service strive to provide accurate and complete information for all data users. Realistically, however, the program meets the needs of some data users better than others.

The Census Bureau, to address the concerns of these many data users, will continue to release annual quality profiles. These profiles will include the results of studies conducted to assess the quality of the data and any reports on the results of quality assurance programs. The profiles also will describe any changes in the programs that may effect the quality of the statistics. In this way, the Census Bureau hopes to provide the information and knowledge needed to make it's many data users "educated consumers" of the merchandise trade data.

Appendix A

Annotated Bibliography

Bureau of the Census, 1992, "Adjustment of Foreign Trade Data for Seasonality and Price Change." Foreign Trade Division, Bureau of the Census, U.S. Department of Commerce, Washington, DC.

This technical paper explains the origin of the constant dollar series and the methods used to seasonally adjust and deflate the merchandise trade data. Contact: Diane Oberg (301) 763-5708.

Bureau of the Census, 1987, "U.S. Merchandise Trade: July 1987," U.S. Department of Commerce News. FT900 CB-87-147. Washington, DC: U.S. Department of Commerce.

This issue contains the special notice on improved data coverage with Canada and gives undocumented exports annually for 1970 through 1988 and monthly for 1987. Contact: Trade Information Office (301) 763-5140.

Bureau of the Census, 1992, "U.S. Merchandise Trade: December 1992," U.S. Department of Commerce News. FT900 CB-93-36. Washington, DC: U.S. Department of Commerce.

This issue contains the special announcement concerning imports of motor vehicles from Japan not reflected in the import trade statistics. For more information, contact Paul Herrick (301) 763-5201.

National Research Council, Panel on Foreign Trade Statistics, 1992, Behind the Numbers: U.S. Trade in the World Economy. Washington, DC: National Academy Press.

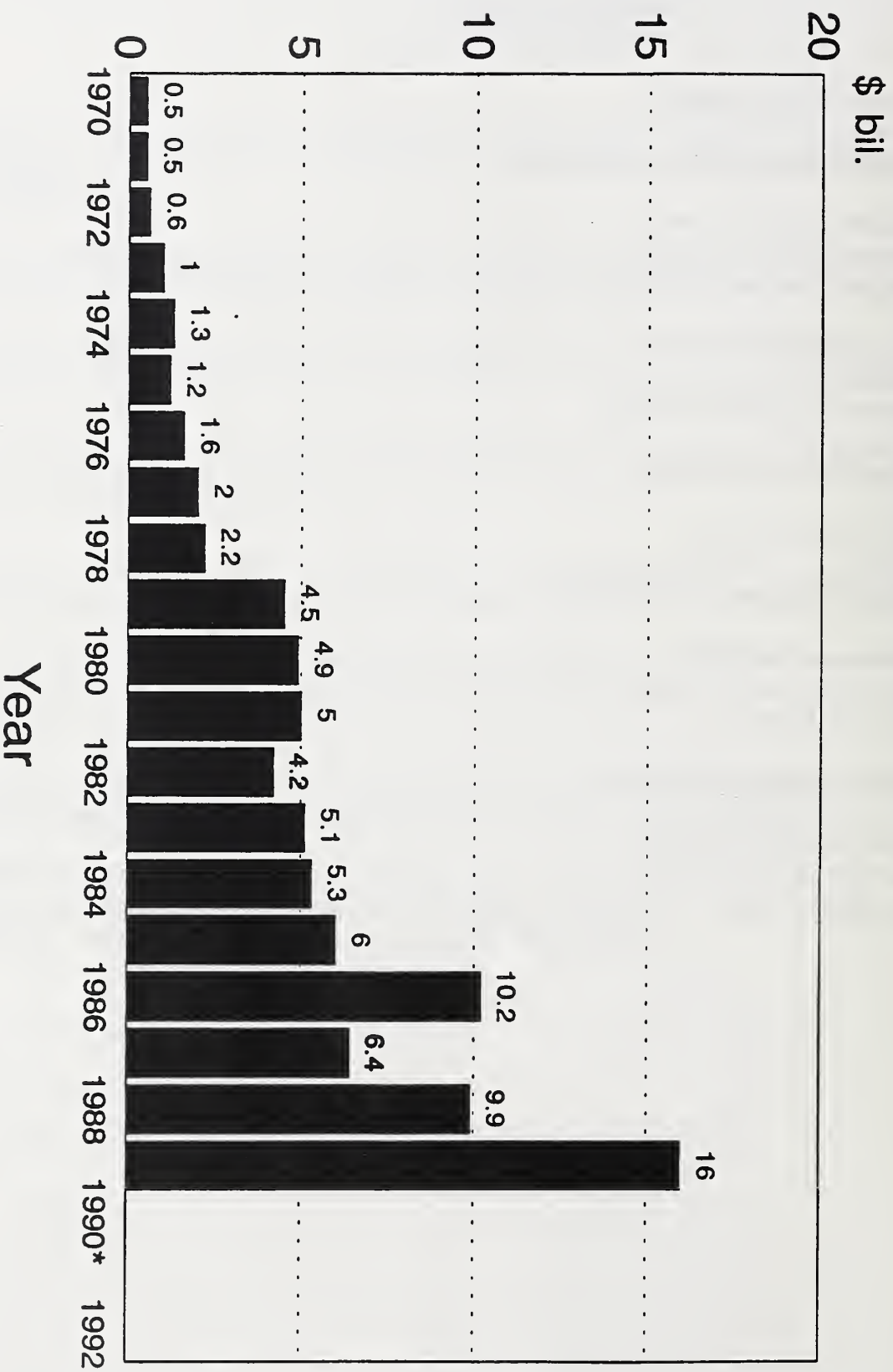
This report covers issues related to the merchandise trade statistics and the need for information to guide the public and private sectors in the current world economy. From a quality standpoint, it focuses on improving data collection, accuracy and analysis.

Appendix B

Glossary of Acronyms

ABI	- Automated Broker Interface
AERP	- Automated Exporter Reporting Program
AES	- Automated Exporter System
BEA	- Bureau of Economic Analysis
BLS	- Bureau of Labor Statistics
EC	- European Economic Community
EEP	- Exporter Education Program
GDP	- Gross Domestic Product
HS	- Harmonized System of Classification
IPI	- International Price Indexes
MOT	- Mode of Transport
NAS	- National Academy of Sciences
SED	- Shipper's Export Declaration

Unaccounted Exports to Canada 1970-1992



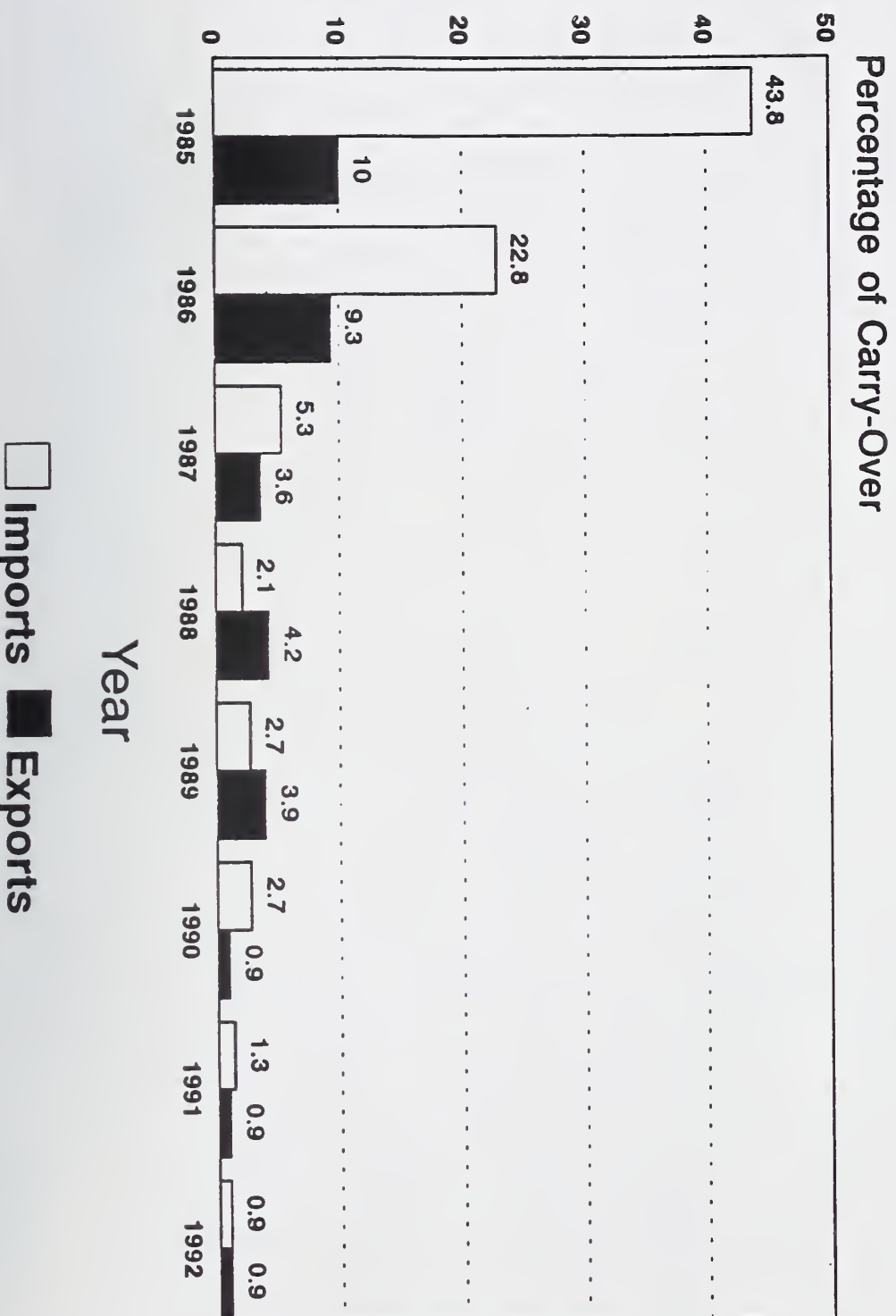
*First year of data exchange

Source: U.S./Canadian Reconciliations

Total Import and Export Carry-Over

Percentages of Total Values

1985-1992



CB/Bureau of the Census Library



5 0673 01036727 7